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Paleocene Deposits of the San Juan Basin, New Mexico. By W. J. SINCLAIR and WALTER GRANGER. Bull. Am. Museum Nat. History, XXXIII, Art. XXII, June 3, 1914. pp. 297-316, Pls. XX-XXVII, figs. 2.

The Paleocene Puerco and Torrejon formations are exposed along the south and southwest margin of the San Juan Basin in northwestern New Mexico. There is an unconformity, shown both by erosion and by an abrupt faunal change, at the base of the Puerco (unconsolidated clays and channel sandstones) which appears "to be the dividing line between Cretaceous and Tertiary in this region." The Torrejon succeeds the Puerco without lithologic or stratigraphic break. The boundary between the two depends on fossil evidence, and is not exactly determined. Basal Wasatch sandstone and in some places seemingly younger sandstone unconformably overlies the Torrejon. A fluvialite origin is indicated for both the Puerco and Torrejon.

Two Puerco fossil levels, to the upper of which *Polymastodon* is confined, were accurately located. Fossil plants were found in the Puerco. Torrejon fossils were discovered much below previously located horizons. The sections measured by the authors are compared with Gardner's Rio Puerco and Arroyo Torrejon sections. The pre-Puerco beds are, beginning with the oldest exposed, clays, conglomerate, clays, conglomerate sandstone with silicified logs and pebbles of volcanic rocks. Dinosaur remains occur in both clay horizons. "More or less of this series of beds may be correlatable with the Animas formation."

V. O. T.

Cement Materials and Industry in the State of Washington. By SOLON SHEDD. Bull. No. 4, Washington Geol. Survey. Pp. 268, figs. 10, pls. 21. Olympia, 1913.

Increasing importations of cement from California and Europe have led to investigation of the state's possibilities in cement production. The results are given in this, the fourth of a series of bulletins on natural resources. The work was directed by Solon Shedd, assistant state geologist and professor of geology, Washington State College.

More than one-third of the report is taken up with chapters on the history of the cement industry, various kinds of cements, and origin and composition of raw materials. Manufacturing processes are described briefly and there is an excellent chapter on the factors to be considered

in locating a plant. The remainder of the report takes up by counties the results of field work and contains maps of limestone and clay areas with analyses of samples from them.

In the eastern part of the states metamorphic limestones of doubtful age are found only as erosion remnants surrounded by basalts and granites. Deposits of economic importance are limited to four counties. Very little stone approaching natural cement rock is found in the state. The analyses show the limestones to be low in magnesia and silica. The latter probably averages less than 5 per cent. Analyses of adjacent clay and shale deposits are given in each case, and some estimate can be made of the possibility of proper mixtures for Portland ratios.

In western Washington sedimentary rocks predominate, but limestone is limited to a few localities in the north. Its quality is very similar to that farther east.

Taking the state as a whole, localities in which limestone and clay or shale outcrop in close proximity and favorably situated relative to transportation are few. At the time the report was published, five plants were in operation and two under construction.

W. B. W.

The Road and Concrete Materials of Iowa. By S. W. BEYER and H. F. WRIGHT. Iowa Geological Survey, Annual Report, 1913. Pp. 33-685, figs. 65, pls. 63, tables 8, maps 2.

Great development in road-building and concrete construction has led to widespread search for materials during the last decade, and justifies detailed examinations by the states of such resources. This report takes up by counties the character, amount, and availability of these materials over the entire state. Some reference is made to all the more important localities, but the records are more complete for the counties poorer in such materials than for those richly supplied.

Nearly three-fourths of the counties in the state have deposits of sand and gravel of economic importance. Gravels of two interglacial epochs are of considerable value. The Aftonian gravel is worked only in southwestern Iowa, because elsewhere it is too deeply buried. The type of locality for Aftonian is in Union County. The Buchanan gravel is available in the northeastern part of the state and is second only to the post-Wisconsin gravels as a source of road and concrete materials. It is found chiefly as a valley phase of outwash and the type locality is in Buchanan County.